This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

(12) UK Patent Application (19) GB (11) 2 212 107 (13) A

(43) Date of A publication 19.07.1989

(21) Application No 8829715.5

(22) Date of filing 20.12.1988

(30) Priority data
(31) 3743808 (32) 23.12.1987 (33) DE

(51) INT CL⁴
B41F 33/00

(52) UK CL (Edition J)
B6C CWB C104 C1201 C1211 C1263 C1270

(56) Documents cited
GB 0262459 A GB 0124369 A

(58) Field of search
UK CL (Edition J) B6C CBHA CBHK CBHL CWB CWR
INT CL⁴ B41F 13/00 33/00

(71) Applicant
Heidelberger Druckmaschinen Aktiengesellschaft

(Incorporated in the Federal Republic of Germany)

D-6900 Heidelberg, Kurfursten-Anlage 52-60, Federal Republic of Germany

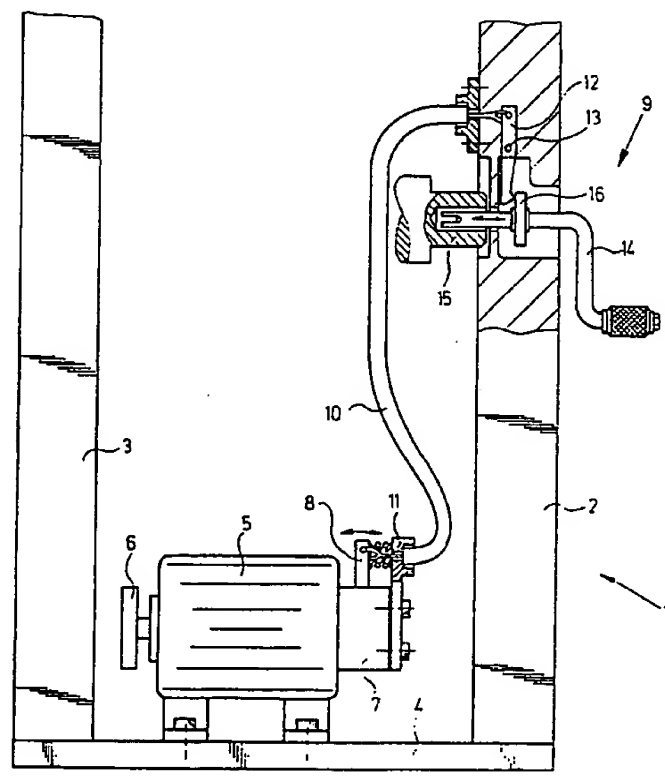
(72) Inventors
Michael Krüger
Berthold Grützmacher

(74) Agent and/or Address for Service
Carpmaels and Ransford
43 Bloomsbury Square, London, WC1A 2RA, United Kingdom

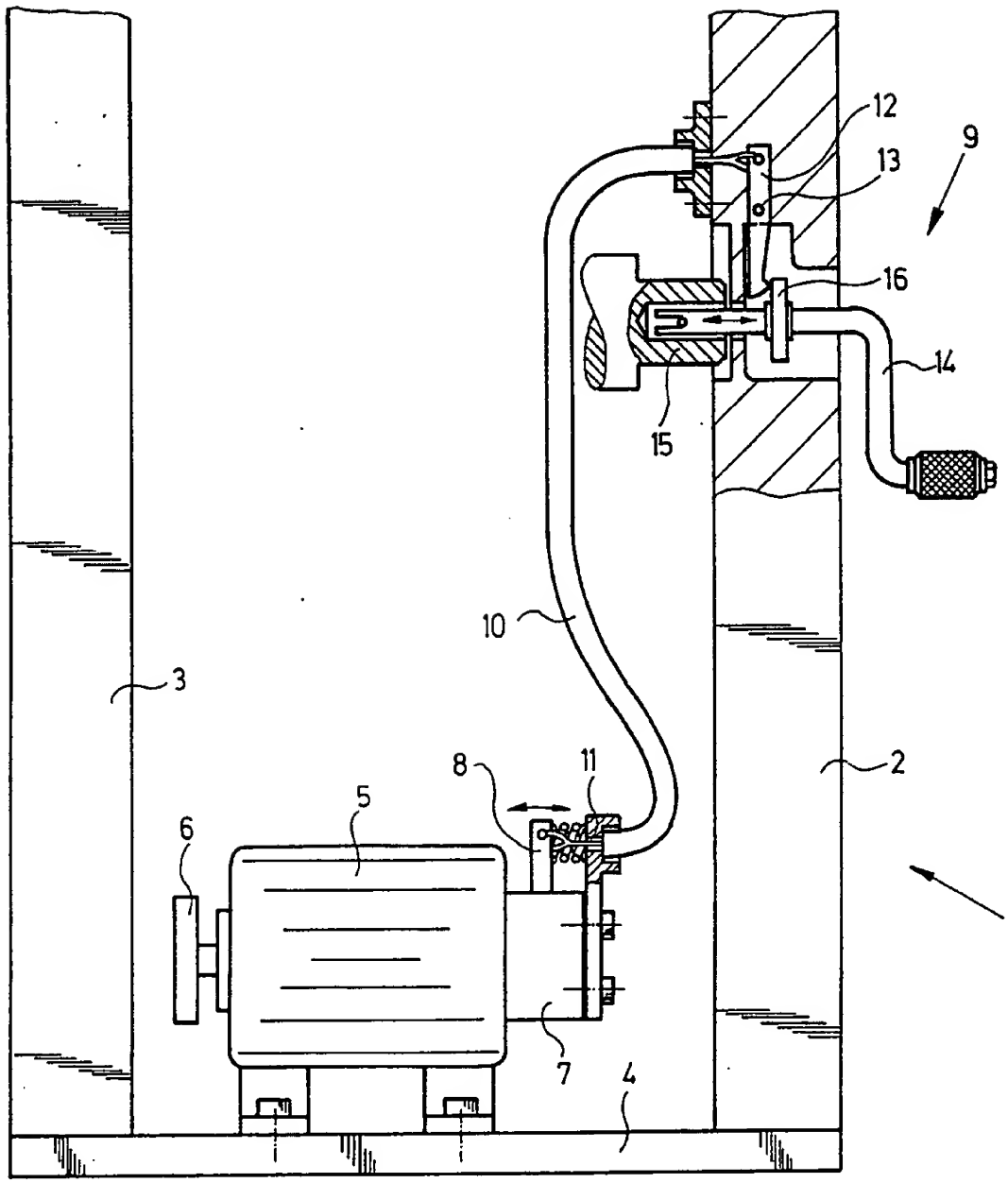
(54) Printing machine motor brake and release system

(57) A printing machine drive motor 5 is provided with a conventional braking device 7 which acts independently of voltage in order to halt the machine as quickly as possible if the supply voltage fails or is switched off; during installation of the printing machine or in other cases in which a supply of electricity is temporarily, absent, the machine can be hand-rotated using a crank 14; a lifting device for the safety brake 7 is operable from a remote position located in the region of the crank. Preferably, the brake lifting lever 8 is connected to a catch (12) via a Bowden cable 10. When the crank 14 is engaged, the catch (12) is actuated and hence the brake is released. When the crank (14) is removed, the catch (12) is released and the brake is locked again.

The self-resetting function of the safety braking arrangement is thus maintained, whilst enabling rotation manually by only a single person.



GB 2 212 107 A


12
13
9
16
14
15
10
3
2
8
11
5
6
1
7
4

DESCRIPTION

PRINTING MACHINE MOTOR BRAKE SYSTEM

The invention relates to a brake having a manually actuable lifting device for a main drive motor of a printing machine, a manual rotating device for initiating a manual rotation when the supply voltage is switched off being provided on the printing machine.

A printing machine drive unit having a brake which comes into effect when the machine is switched off by the interruption of the power supply to a brake lifting magnet is known, for example, from German Auslegeschrift 1,041,507.

It is furthermore known that the main drive motor of a printing machine can be provided with a holding brake or safety brake. This brake comes into effect whenever the supply voltage is switched off or the printing machine is brought to a standstill by actuating the emergency stop switch. To rotate the machine by hand when the supply voltage is switched off, the brake at the main drive motor must be lifted. This is effected by means of a bar or lever arranged directly at the brake. If the intention is at the same time to prevent unintentional lifting of the brake over a relatively long period, it must not be possible to lock this bar or lever. However, if the printing machine is to be rotated by hand, it was hitherto necessary to have this work carried out by two people. While one person held the brake in the open position, the second person was able to rotate the printing machine by hand, for example via a crank. Under circumstances which require rapid backward or forward rotation of the machine by hand, for example in the case of accidents during work, this led to unnecessary delays, since sufficient operatives are frequently not present.

In such cases, operation of the printing machine via the printing machine control system is not possible, since the danger of incorrect operation is too great and hence an increase in the damage could occur. In addition, in such a case, there is no guarantee that the

control is still working reliably.

It is therefore the object of the invention to create a device which enables the printing machine to be moved by just one operative with the supply voltage switched off.

This object is achieved by the fact that the device for lifting the brake has an operating device which is arranged in the region of the manual rotating device. In an advantageous embodiment of the invention, this operating device can be connected via a Bowden cable to the brake venting lever provided at the brake. A Bowden cable of this kind is inexpensive and has the advantage of universal application. Above all, this also provides the possibility of in all cases effecting the operative connection between brake and manual rotating device in the case of printing machines of different designs, i.e. in the case of printing machines, the main drive motor of which is arranged at various positions.

By virtue of this invention, there is now also the possibility of arranging the motor at the most favourable position within the printing machine. Thus, the motor can be arranged where power transmission to the gear train or to the drive elements of the printing machine can be effected directly and, at the same time where the motor takes up the least space. The brake, too, can also be integrated into the motor, since a lever which acts on the brake and must be actuable outside the motor is not absolutely necessary, it being possible to arrange a Bowden cable directly on the brake.

According to a further development of the invention, it is also possible, instead of a Bowden cable, to connect a hydraulic power transmission system between the operating device and the brake. For this purpose, a hydraulic cylinder is arranged as a master cylinder at the operating device. The hydraulic pressure is transmitted to the brake via a line, which can be arranged in any desired manner. In this case, there is a hydraulic cylinder at the brake, said cylinder acting as an actuator.

In a further advantageous embodiment of the invention, this operating device can have a foot pedal, enabling the brake to be lifted by means of operation with the foot. Thus it is simpler to rotate this printing machine, especially in the case of printing machines having a plurality of printing units, which require a greater amount of force for the manual rotation of the printing machine.

In a further embodiment of the invention, it is envisaged that the operating device be coupled to the manual rotating device. The manual rotation at the printing machine is thereby considerably facilitated. This coupling is effected, for example, by the provision of a crank which can be inserted into a shaft of the printing machine, the Bowden cable being actuated via a catch when the crank is inserted. When the crank is removed, the brake is immediately reclosed, with the result that the brake is lifted only during the actual manual rotation. Of course, it is also possible to use a mechanical linkage instead of a Bowden cable. It is equally possible to establish the connection between the operating device and the brake via a hydraulic line.

The invention is explained in greater detail below with reference to an exemplary embodiment.

The figure shows, in schematic form, a detail of a printing machine having a device for the manual movement of the machine.

A housing 1 of a printing machine (not shown in greater detail here) is indicated schematically with its side walls 2,3 and a base 4. Within the housing is located the printing machine main drive motor 5, which is secured on the base 4 and acts by its drive wheel 6 on a gear train (not shown here). The brake 7 is a stopping device, which acts independently of voltage and halts the machine as quickly as possible if the electrical control system fails or in the event of an "emergency stop". During the installation of the printing machine or in those cases where a supply of electricity is temporarily absent (emergencies), it must be possible to rotate the

machine by hand. For this purpose, the brake is provided with the lever 8. For reasons of safety, this lever must be self-resetting. It is thus apparent that manual rotation of the machine is only possible if the brake is manually lifted at the same time. This manual operation of the machine is required in particular in the case of malfunctions or emergencies. In such cases, the supply of electricity to the machine is switched off since, in the case of incorrect control or incorrect operation, the damage can easily be increased. Since motor 5 and a manual drive of the printing machine are often far apart, a Bowden cable 10 is provided between the manual drive 9 and the brake 7. The cable 11 of the Bowden cable is secured, on the one hand, at an eye of the lever 8 and, on the other hand, at an eye of a catch 12. The catch 12 is secured on the side wall 2 in such a way as to be pivotable via a spindle 13. The manual drive 9 consists of a crank 14, which can be inserted into a shaft 15, for example of a cylinder of a printing unit. Following the insertion of this crank 14, a rotation of the printing machine is possible. The crank 14 has a flange 16 and, when the crank 14 is introduced into the shaft 15, this flange 16 comes into contact with the catch 12 and moves this catch in such a way that the brake 7 is lifted via the Bowden cable 10. The braking action on all the driven parts of the printing machine is thereby cancelled and the manual rotation can take place. When the crank 14 is removed from the shaft 15, the drive is locked again via the brake 7. The self-resetting function of the safety brake arrangement is thus maintained.

Instead of the crank 14 shown here, it is also possible to provide an operating element which either only releases the brake or only acts on the shaft 15. In addition, there is the possibility of arranging the flange 16 in a longitudinally displaceable and lockable fashion on the crank, so that the release of the brake only or the action on the shaft 15 only is possible with this crank 14 too.

LIST OF COMPONENTS

1 Housing
2 Side wall
3 Side wall
4 Base
5 Printing machine main drive motor
6 Drive wheel
7 Brake
8 Lever
9 Manual drive
10 Bowden cable
11 Cable
12 Catch
13 Spindle
14 Crank
15 Shaft
16 Flange

It will be understood that the invention has been described above purely by way of example, and that various modifications of detail can be made within the ambit of the invention.

CLAIMS

1. A printing machine main drive motor brake system comprising a main drive motor brake, a manually actuable lifting device permitting the main drive motor brake to be released, and a manual rotating device permitting manual rotation of the machine when the power supply is switched off, wherein the said lifting device is operable by means of an operating device which is mounted in the vicinity of the manual rotating device.

2. A system according to claim 1, wherein the operating device is connected to the said lifting device by way of a Bowden cable.

3. A system according to claim 1, wherein the operating device is connected to the said lifting device by way of a hydraulic power transmission line.

4. A system according to claim 1, 2 or 3, wherein the operating device has a pedal, permitting the brake to be released by a foot movement.

5. A system according to claim 2 or 3, wherein the means of connection between the operating device and the manual rotating device is so designed and disposed that actuation of the manual rotating device brings about the release of the brake.

6. A system according to claim 5, the design of which is such that the brake locks automatically after actuation of the manual rotating device.

7. A system according to any of the preceding claims, wherein the manual rotating device comprises a crank handle which is engageable (when there is occasion for manual rotation of the machine to be performed) with the relevant shaft, and the operating

device has a catch which is so mounted that, when the crank handle is engaged with the said shaft, this catch is constrained to move in such a sense as to cause the brake to be released.

8. A system according to claim 1, substantially as described with reference to the accompanying drawing.

Published 1969 at The Patent Office, State House, 66/71 High Holborn, London WC1R 4TP. Further copies may be obtained from The Patent Office. Sales Branch, St Mary Cray, [illegible] St Mary Cray, Kent. Con. 1/87

12/08/2003, EAST Version: 1.4.1